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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,477	06/03/2005	Toshiharu Kobayashi	P/2850-110	3344
2352	7590	06/02/2009	EXAMINER	
OSTROLENK FABER GERB & SOFFEN 1180 AVENUE OF THE AMERICAS NEW YORK, NY 100368403			FOGARTY, CAITLIN ANNE	
ART UNIT	PAPER NUMBER			
			1793	
MAIL DATE	DELIVERY MODE			
			06/02/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/537,477	Applicant(s) KOBAYASHI ET AL.
	Examiner CAITLIN FOGARTY	Art Unit 1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 23 March 2009.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-24 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-24 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 03 June 2005 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-166/08)
 Paper No(s)/Mail Date 3/23/2009

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____

5) Notice of Informal Patent Application

6) Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 23, 2009 has been entered.

Terminal Disclaimer

2. The terminal disclaimer filed on March 23, 2009 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US 6,966,956 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Status of Claims

3. Claims 1 – 24 are pending and are presented for this examination. No claims have been amended.

Status of Previous Rejections

4. The rejection of claims 1 – 24 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Cetel et al. (EP 0 848 071 A1) has been withdrawn.

The nonstatutory obviousness-type double patenting rejection of claims 1 – 24 as being unpatentable over claims 1 – 3 of U.S. Patent No. 6,966,956 has been withdrawn in view of the Terminal Disclaimer filed March 23, 2009.

Priority

5. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

6. The information disclosure statement (IDS) was submitted on March 23, 2009.

The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 1 – 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cetel et al. (EP 0 848 071 A1).

With respect to instant claim 1, p. 2 lines 29-36 of Cetel disclose a nickel based single crystal super alloy with an overlapping composition as seen in Table 1 below.

Table 1

Element	Claim 1 (Weight %)	Cetel et al. (Weight %)	Overlapping Range (Weight %)
Al	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0
Ta	4.0 – 10.0	4.0 – 8.0	4.0 – 8.0
Mo	1.1 – 4.5	0 – 4.0	1.1 – 4.0
W	4.0 – 10.0	5.0 – 10.0	5.0 – 10.0
Re	3.1 – 8.0	0 – 8.5	3.1 – 8.0
Hf	0 – 0.50	0 – 3.0	0 – 0.50

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Cr	2.0 – 5.0	0.4 – 2.9	2.0 – 2.9
Co	0 – 9.9	3.0 – 20.0	3.0 – 9.9
Ru	4.1 – 14.0	0 – 10.0	4.1 – 10.0
Ni + impurities	balance	balance	balance

Instant claim 2 recites the same super alloy as claim 1 (see Table 1) but with 4.0

– 6.0 wt% Ta that has an overlapping range with Cetel of 4.0 – 6.0 wt%.

Instant claim 3 recites the same super alloy as claim 1 (see Table 1) but with 4.0

– 6.0 wt% Ta that has an overlapping range with Cetel of 4.0 – 6.0 wt% and 2.9 – 4.5

wt% Mo that has an overlapping range with Cetel of 2.9 – 4.0 wt%.

In regards to instant claims 4 – 6, p. 2 lines 29 – 36 of Cetel disclose a nickel based single crystal super alloy with an overlapping composition as seen in Table 2 below.

Table 2

Element	Claim 4 (Weight %)	Claim 5 (Weight %)	Claim 6 (Weight %)	Cetel et al. (Weight %)
Al	5.9	5.8	5.8	5.0 – 7.0
Ta	5.9	5.6	5.8	4.0 – 8.0
Mo	3.9	3.1	3.9	0 – 4.0
W	5.9	5.8	5.8	5.0 – 10.0
Re	4.9	4.9	4.9	0 – 8.5
Hf	0.10	0.10	0.10	0 – 3.0
Cr	2.9	2.9	2.9	0.4 – 2.9
Co	5.9	5.8	5.8	3.0 – 20.0
Ru	5.0	5.0	6.0	0 – 10.0
Ni + impurities	Balance	Balance	Balance	Balance

In regards to instant claims 7 – 9, claim 7 recites the Ni-based single crystal super alloy of claim 1 further comprising 0 – 2.0 wt% of Ti in terms of weight ratio.

Instant claim 8 recites the Ni-based single crystal super alloy of claim 1 further comprising 0 – 4.0 wt% of Nb in terms of weight ratio. Instant claim 9 recites the Ni-based single crystal super alloy of claim 1 further comprising at least one of the

elements selected from B, C, Si, Y, La, Ce, V and Zr. Cetel teaches that the super alloy may also comprise 0 – 1.5 wt% Ti, 0 – 2.0 wt% Nb, 0 – 1 wt% Y, 0 – 1 wt% La, and 0 – 1.0 wt% V (see p. 2 lines 29 – 36) whose ranges overlap with those recited in instant claims 7 – 9.

In regards to instant claims 10 and 11, p. 2 lines 29 – 36 of Cetel disclose a nickel based single crystal super alloy with a clearly overlapping composition as seen in Tables 3 and 4 below.

Table 3

Element	Claim 10 (Weight %)	Cetel et al. (Weight %)	Overlapping Range (Weight %)
Al	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0
Ta	4.0 – 10.0	4.0 – 8.0	4.0 – 8.0
Mo	1.1 – 4.5	0 – 4.0	2.9 – 4.0
W	4.0 – 10.0	5.0 – 10.0	5.0 – 10.0
Re	3.1 – 8.0	0 – 8.5	3.1 – 8.0
Hf	0 – 0.50	0 – 3.0	0 – 0.50
Cr	2.0 – 5.0	0.4 – 2.9	2.0 – 2.9
Co	0 – 9.9	3.0 – 20.0	3.0 – 9.9
Ru	4.1 – 14.0	0 – 10.0	4.1 – 10.0
Ni + impurities	Balance	Balance	Balance
B	≤ 0.05	—	0
C	≤ 0.15	—	0
Si	≤ 0.1	—	0
Y	≤ 0.1	0 – 1	0 – 0.1
La	≤ 0.1	0 – 1	0 – 0.1
Ce	≤ 0.1	—	0
V	≤ 1	0 – 1.0	0 – 1.0
Zr	≤ 0.1	—	0

Table 4

Element	Claim 11 (Weight %)	Cetel et al. (Weight %)	Overlapping Range (Weight %)
Al	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0
Ta	4.0 – 10.0	4.0 – 8.0	4.0 – 8.0
Mo	1.1 – 4.5	0 – 4.0	2.9 – 4.0

W	4.0 – 10.0	5.0 – 10.0	5.0 – 10.0
Re	3.1 – 8.0	0 – 8.5	3.1 – 8.0
Hf	0 – 0.50	0 – 3.0	0 – 0.50
Cr	2.0 – 5.0	0.4 – 2.9	2.0 – 2.9
Co	0 – 9.9	3.0 – 20.0	3.0 – 9.9
Ru	10.0 – 14.0	0 – 10.0	10.0
Ni + impurities	Balance	Balance	Balance
Nb	≤ 4.0	0 – 2.0	0 – 2.0
Ti	≤ 2.0	0 – 1.5	0 – 1.5
B	≤ 0.05	—	0
C	≤ 0.15	—	0
Si	≤ 0.1	—	0
Y	≤ 0.1	0 – 1	0 – 0.1
La	≤ 0.1	0 – 1	0 – 0.1
Ce	≤ 0.1	—	0
V	≤ 1	0 – 1.0	0 – 1.0
Zr	≤ 0.1	—	0

Instant claim 12 recites the same super alloy as claim 11 (see Table 4) but with

5.8 – 7.0 wt% Al (overlapping range: 5.8 – 7.0 wt%), 4.0 – 5.6 wt% Ta (overlapping range: 4.0 – 5.6 wt%), 3.3 – 4.5 wt% Mo (overlapping range: 3.3 – 4.0 wt%), 2.9 – 4.3 wt% Cr (overlapping range: 2.9 wt%), and 4.1 – 14.0 wt% Ru (overlapping range: 4.1 – 10.0 wt%).

Instant claim 13 recites the same super alloy as claim 11 (see Table 4) but with 2.9 – 5.0 wt% Cr (overlapping range: 2.9 wt%) and 6.5 – 14.0 wt% Ru (overlapping range: 6.5 – 10.0 wt%).

Instant claim 14 recites the same super alloy as claim 11 (see Table 4) but with 4.0 – 6.0 wt% Ta (overlapping range: 4.0 – 6.0 wt%), 3.3 – 4.5 wt% Mo (overlapping range: 3.3 – 4.0 wt%), and 4.1 – 14.0 wt% Ru (overlapping range: 4.1 – 10.0 wt%).

Instant claim 15 recites the same super alloy as claim 11 (see Table 4) but with 4.0 – 5.6 wt% Ta (overlapping range: 4.0 – 5.6 wt%), 3.3 – 4.5 wt% Mo (overlapping range: 3.3 – 4.0 wt%), and 4.1 – 14.0 wt% Ru (overlapping range: 4.1 – 10.0 wt%).

Instant claim 16 recites the same super alloy as claim 11 (see Table 4) but with 3.1 – 4.5 wt% Mo (overlapping range: 3.1 – 4.0 wt%), and 4.1 – 14.0 wt% Ru (overlapping range: 4.1 – 10.0 wt%).

Instant claim 17 recites the same super alloy as claim 11 (see Table 4) but with 5.8 – 7.0 wt% Al (overlapping range: 5.8 – 7.0 wt%), 3.1 – 4.5 wt% Mo (overlapping range: 3.1 – 4.0 wt%), and 4.1 – 14.0 wt% Ru (overlapping range: 4.1 – 10.0 wt%).

Instant claim 18 recites the same super alloy as claim 11 (see Table 4) but with 3.1 – 4.5 wt% Mo (overlapping range: 3.1 – 4.0 wt%), 2.9 – 4.3 wt% Cr (overlapping range: 2.9 wt%) and 4.1 – 14.0 wt% Ru (overlapping range: 4.1 – 10.0 wt%).

Instant claim 19 recites the same super alloy as claim 11 (see Table 4) but with 4.0 – 10.0 wt % Ta + Nb + Ti (overlapping range: 4.0 – 10.0), 3.3 – 4.5 wt% Mo (overlapping range: 3.3 – 4.0 wt%), and 4.1 – 14.0 wt% Ru (overlapping range: 4.1 – 10.0 wt%).

Regarding instant claims 20 – 24, Cetel does not specifically teach the lattice constant of the matrix, the lattice constant of the precipitation phase, or the dislocation space of the alloy. However, one of ordinary skill in the art would have expected the Ni-based single crystal super alloy of Cetel to have physical properties similar to those of the Ni-based super alloy of the instant invention because the alloy of Cetel has an overlapping composition and is made using a similar method. See MPEP 2112.01.

Since the claimed compositional ranges of claims 1 – 24 either overlap or are within the ranges disclosed by Cetel, a *prima facie* case of obviousness exists. See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed Ni-based single crystal super alloy composition from the Ni-based single crystal super alloy composition disclosed by Cetel because Cetel teaches the same utility (i.e. blades in gas turbines) in the whole disclosed range.

9. Claims 1, 2, 7 – 11, and 20 – 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Darolia et al. (US 6,190,471).

With respect to instant claim 1, col. 2 lines 26 – 30 and col. 4 lines 18 – 32 of Darolia disclose a Ni-based single crystal super alloy with an overlapping composition as seen in Table 5 below.

Table 5

Element	Claim 1 (Weight %)	Darolia et al. (Weight %)	Overlapping Range (Weight %)
Al	5.0 – 7.0	5 – 7	5 – 7
Ta	4.0 – 10.0	4 – 12	4 – 10.0
Mo	1.1 – 4.5	0 – 2	1.1 – 2
W	4.0 – 10.0	3 – 8	4.0 – 8
Re	3.1 – 8.0	0 – 8	3.1 – 8
Hf	0 – 0.50	0 – 0.15	0 – 0.15
Cr	2.0 – 5.0	1 – 10	2.0 – 5.0
Co	0 – 9.9	4 – 20	4 – 9.9
Ru	4.1 – 14.0	0 – 6	4.1 – 6
Ni + impurities	balance	balance	balance

Instant claim 2 recites the same super alloy as claim 1 (see Table 5) but with 4.0 – 6.0 wt% Ta that has an overlapping range with Darolia of 4.0 – 6.0 wt%.

In regards to instant claims 7 – 9, claim 7 recites the Ni-based single crystal super alloy of claim 1 further comprising 0 – 2.0 wt% of Ti in terms of weight ratio. Instant claim 8 recites the Ni-based single crystal super alloy of claim 1 further comprising 0 – 4.0 wt% of Nb in terms of weight ratio. Instant claim 9 recites the Ni-based single crystal super alloy of claim 1 further comprising at least one of the elements selected from B, C, Si, Y, La, Ce, V and Zr. Darolia teaches that the super alloy may also comprise 0 – 2 wt% Ti, 0 – 1 wt% Nb, 0 – 0.01 wt% B, 0 – 0.1 wt% C, and 0 – 0.1 wt% Y (see col. 4 lines 18-32) whose ranges overlap with those recited in instant claims 7 – 9.

In regards to instant claims 10 and 11, col. 2 lines 26 – 30 and col. 4 lines 18 – 32 of Darolia teach a nickel based single crystal super alloy with a clearly overlapping composition as seen in Tables 6 and 7 below.

Table 6

Element	Claim 10 (Weight %)	Darolia et al. (Weight %)	Overlapping Range (Weight %)
Al	5.0 – 7.0	5 – 7	5 – 7
Ta	4.0 – 10.0	4 – 12	4 – 10.0
Mo	1.1 – 4.5	0 – 2	1.1 – 2
W	4.0 – 10.0	3 – 8	4.0 – 8
Re	3.1 – 8.0	0 – 8	3.1 – 8
Hf	0 – 0.50	0 – 0.15	0 – 0.15
Cr	2.0 – 5.0	1 – 10	2.0 – 5.0
Co	0 – 9.9	4 – 20	4 – 9.9
Ru	4.1 – 14.0	0 – 6	4.1 – 6
Ni + impurities	Balance	Balance	Balance
B	≤ 0.05	0 – 0.01	0 – 0.01
C	≤ 0.15	0 – 0.1	0 – 0.1
Si	≤ 0.1	---	0
Y	≤ 0.1	0 – 0.1	0 – 0.1
La	≤ 0.1	---	0

Ce	≤ 0.1	---	0
V	≤ 1	---	0
Zr	≤ 0.1	---	0

Table 7

Element	Claim 11 (Weight %)	Darolia et al. (Weight %)	Overlapping Range (Weight %)
Al	5.0 – 7.0	5 – 7	5 – 7
Ta	4.0 – 10.0	4 – 12	4 – 10.0
Mo	1.1 – 4.5	0 – 2	1.1 – 2
W	4.0 – 10.0	3 – 8	4.0 – 8
Re	3.1 – 8.0	0 – 8	3.1 – 8
Hf	0 – 0.50	0 – 0.15	0 – 0.15
Cr	2.0 – 5.0	1 – 10	2.0 – 5.0
Co	0 – 9.9	4 – 20	4 – 9.9
Ru	10.0 – 14.0	0 – 6	4.1 – 6
Ni + impurities	Balance	Balance	Balance
Nb	≤ 4.0	0 – 1	0 – 1
Ti	≤ 2.0	0 – 2	0 – 2
B	≤ 0.05	0 – 0.01	0 – 0.01
C	≤ 0.15	0 – 0.1	0 – 0.1
Si	≤ 0.1	---	0
Y	≤ 0.1	0 – 0.1	0 – 0.1
La	≤ 0.1	---	0
Ce	≤ 0.1	---	0
V	≤ 1	---	0
Zr	≤ 0.1	---	0

Regarding instant claims 20 – 24, Darolia does not specifically teach the lattice

constant of the matrix, the lattice constant of the precipitation phase, or the dislocation space of the alloy. However, one of ordinary skill in the art would have expected the Ni-based single crystal super alloy of Darolia to have physical properties similar to those of the Ni-based super alloy of the instant invention because the alloy of Darolia has an overlapping composition and is made using a similar method. See MPEP 2112.01.

Since the claimed compositional ranges of claims 1, 2, 7 – 11, and 20 – 24 either overlap or are within the ranges disclosed by Darolia, a *prima facie* case of obviousness

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exists. See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed Ni-based single crystal super alloy composition from the Ni-based single crystal super alloy composition disclosed by Darolia because Darolia teaches the same utility (i.e. blades in gas turbines) in the whole disclosed range.

Response to Arguments

10. Applicant's arguments filed March 23, 2009 have been fully considered but they are not persuasive.

Arguments are summarized as follows:

- a. Applicant submitted Attachment A (Fig. A) to illustrate the relationship between Larson-Miller parameters and stresses loaded onto the alloy. Applicant argues that the results shown in Fig. A demonstrate that the alloy claimed in the present application has a strength that is clearly greater than that of the alloy disclosed in Cetel. Therefore, the alloy claimed in the present application provides specific technical advantages over that of the Cetel reference, which advantages are not obvious from the disclosure contained in Cetel, as shown in Fig. A.
- b. Applicants submitted Yokokawa et al. to show that Ru is the only element that partitions into the γ phase ($K>1$) during the entire temperature range illustrated in Fig. 4. This improves the creep strength of the alloy.
- c. The advantages obtained by including Ru in the alloy are not disclosed in Cetel, and therefore, the alloy claimed in the present application and that of Cetel

are entirely different from each other in respect of the addition of Ru as the essential element in the alloy.

d. The composite ratio of Ru in the alloy of the present application (4.1-14.0 wt%) does not overlap with that disclosed in Cetel (0.25-4.0%).

Examiner's responses are as follows:

a. Attachment A of Applicant's arguments is not in the form of a declaration and therefore will be considered as part of Applicant's arguments. The arguments of counsel cannot take the place of evidence in the record. See MPEP 716.01. Furthermore, the stress lines of the present application and the prior art are very similar to each other, specifically between the Larson-Miller Parameters of 44-46. Applicant has not shown the criticality of the stress load, particularly how the difference of stress loads of a few ksi between the present application and the prior art, for example at a Larson-Miller parameter of 45, exhibits a significant difference in strength between the instant alloy and the alloy of the prior art.

b. Applicant has not submitted the information present in Yokokawa et al. in declaration form and therefore it will be considered as part of Applicant's arguments. See MPEP 716.01. In addition, p. 3 lines 23-24 of Cetel teach that when present, Pt, Pd, Ru, and Os are effective in increasing the creep-rupture strength of the alloy. Therefore, it would have been obvious to one of ordinary skill in the art that the addition of Ru in the alloy would improve the creep-rupture strength of the alloy.

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- c. Cetel is not required to teach the same advantages obtained by including Ru in the alloy as those recited in the instant application. See MPEP 2144 IV.
- d. The Examiner has relied on EP 0848 071 A1 published June 17, 1998 as prior art in the previous rejection, not the final published patent. Therefore, p. 2 lines 29-36 of Cetel disclose a nickel based single crystal super alloy with 0-10.0 wt% of one or more elements selected from ruthenium, palladium, platinum, rhodium, iridium and osmium which overlaps with the composition of ruthenium recited in the instant claims.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAITLIN FOGARTY whose telephone number is (571)270-3589. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art
Unit 1793

CF